TRI-PARTY AGREEMENT

Change Notice Number TPA-CN- 656	TPA CHANGE NOTICE FORM	Date: 3/31/2015
Document Number, Title, and Revision: SGW-56993, Sampling Instruction for the 300-FF-5 Operable Unit Supplemental Post ROD Field Investigation, Rev 0		Date Document Last Issued: 8/27/2014
Originator: Randy Hermann		Phone: 376-4445

Description of Change:
Document is being updated to include two additional borehole locations that have been selected for pre-treatment sampling. Figure 3 has been updated. Table 3 was updated to include the addition of two new boreholes. Tables 4 and 5 have been updated with the additional borehole identifications.

M. Cline (DOE) and B. Simes (Lead Regulatory Agency) agree that the proposed change modifies an approved workplan/document and will be processed in accordance with the Tri-Party Agreement Action Plan, Section 9.0, *Documentation and Records*, and not Chapter 12.0, *Changes to the Agreement*.

Selected pages from the above mentioned sampling instruction have been modified to add two wells for pre-treatment sampling. A new figure has been generated that includes the location of the two additional wells. Added text is double-underlined and deleted text has been identified by ~~strikethrough~~.

Note: Affected pages numbers include pages 5, 11, 12, 13, 17 and 19 (attached).

Justification and Impacts of Change:
Two wells are needed for additional pre-treatment sampling after the selection of the refined enhanced attenuation area (EAA) as per Principal Study Question 2a. The two additional wells will provide needed information for the characteristics of the vadose zone within the EAA prior to treatment for uranium sequestration using the polyphosphate solution. Figure 3 was updated to reflect the locations of these two wells in relation to the wells of interest referred to in this sampling instruction.

Approvals:

DOE Project Manager	Date 4/16/15	[X] Approved [ ] Disapproved
EPA Project Manager	Date 4/16/15	[X] Approved [ ] Disapproved
N/A Ecology Project Manager	Date	[ ] Approved [ ] Disapproved

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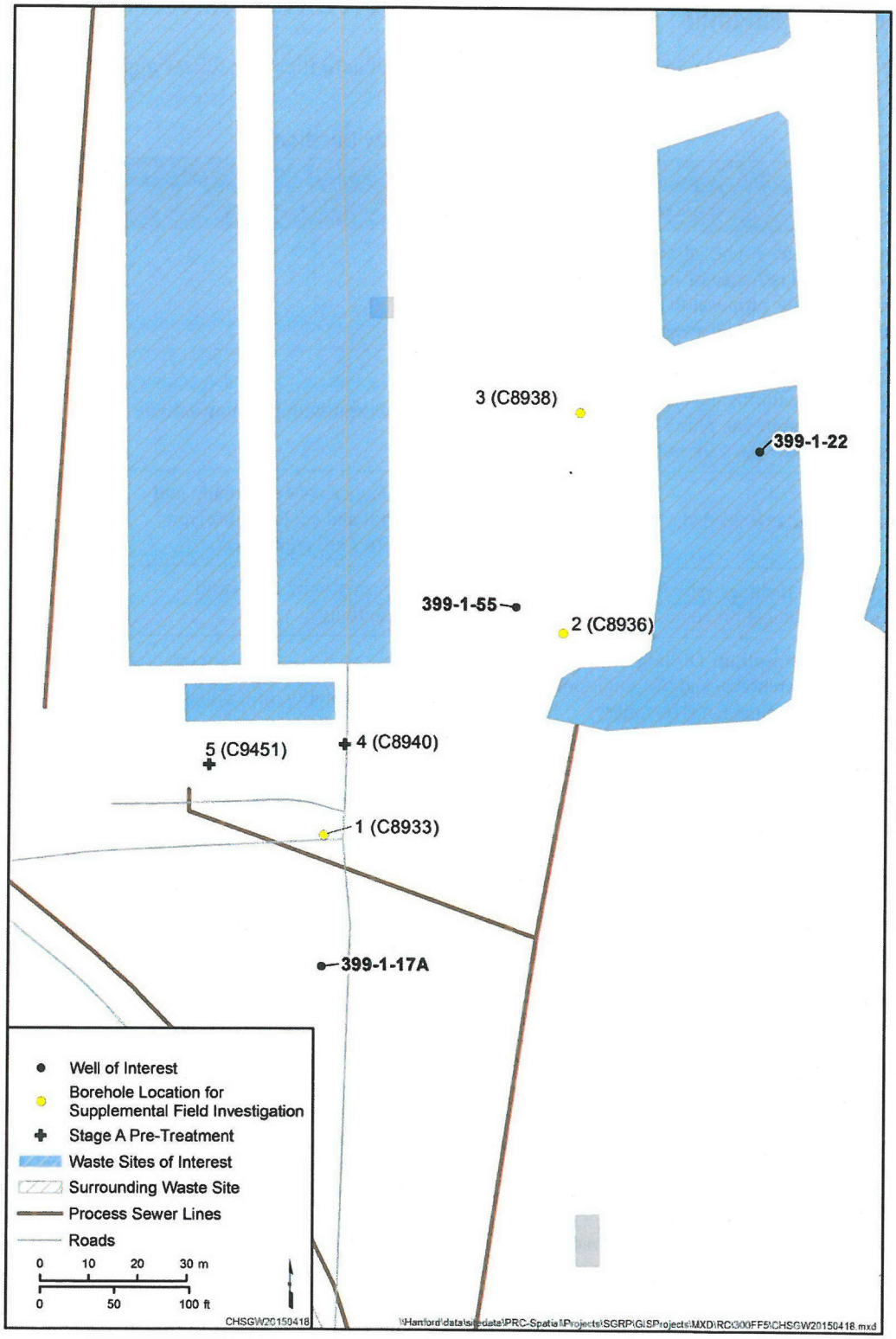

Figure 3. Location of Existing Groundwater Wells 399-1-17A and 399-1-55 and Proposed Boreholes

1.6 Project Schedule

Table 3 provides the approximate durations of major project activities that follow approval of this SI.

Table 3. Project Activity Durations

Activity	Comment	Approximate Duration
Planning: Includes subcontract preparation, preparation and issuance of statement(s) of work, and request(s) for proposal to drilling subcontractor(s) through award of contract(s).		110 days
Cultural and Ecological Review: Includes 140 days preparation of cultural and ecological forms/reports/approval, plus 2 days DOE-RL turnaround, plus 7 days for notification of Tribes.	Concurrent with planning activity.	149 calendar days[a]
Roads and Pads: If needed.	Commences once planning and cultural and ecological review activities are completed.	10 days
Mobilization: Includes submittals and subcontractor training and medical processes.	Concurrent with roads and pads activity.	15 days
Drilling and Sampling: Drilling activity[b] includes drilling three boreholes, and two additional boreholes within final EAA boundary.	Drilling and sampling commences upon completion of mobilization.	15 days
Demobilization	Commences with end of drilling and sampling.	2 days
Analysis of Samples: Includes total uranium samples, completion of leach tests, and final laboratory report.		81 days
Closeout and Borehole Summary Preparation: Includes quality assurance inspection, final surveys, closeout of subcontractor reports, and preparation and approval of borehole summary.	Commences when demobilization is complete.	40 days
Supplemental Post-ROD Field Investigation Summary Report[c]		40 days

a. Based on full cultural review. Actual duration maybe shorter if information from previous cultural reviews can be used.

b. Borehole decommissioning may occur upon determination that borehole will no longer be needed and with operable unit project manager approval. The decision to decommission boreholes is assumed to occur 2 months after the final uranium leach test sample has been delivered to Pacific Northwest National Laboratory to allow for sampling results to be available for consideration in decision making.

c. Report will not include post-treatment sampling to resolve Principal Study Question 2b.

BTR = buyer's technical representative

DOE-RL = U.S. Department of Energy, Richland Operations Office

ROD = record of decision

1.7 Project Management

Project management for the post-ROD field investigation will be as described in DOE/RL-2009-45, *300 Area Remedial Investigation/Feasibility Study Sampling and Analysis Plan for the 300-FF-1, 300-FF-2 and 300-FF-5 Operable Units* (300 Area remedial investigation/feasibility study [RI/FS] sampling analysis plan [SAP]). The project team contains the personnel necessary to perform the SI activities in a safe, efficient, and compliant manner.

2 Sampling Design

The locations of the proposed boreholes for this post-ROD field investigation were chosen due to their proximity to wells 399-1-17A and 399-1-55 (Figure 3), where elevated uranium concentrations within the groundwater have been previously noted.

Three boreholes are proposed to be drilled approximately 0.76 m (2.5 ft) into the top of the aquifer (i.e., one split-spoon sampler length into the aquifer). The top of the aquifer is expected to be at approximately 105 m (344 ft) (NAVD88, *North American Vertical Datum of 1988*). Ground surface elevation in this region is approximately 115 m (377 ft) (NAVD88). The ground surface elevation at each borehole location will be measured prior to initiating drilling activities, and the actual expected depth intervals to be examined and/or sampled will be confirmed based on actual ground surface elevation.

Sampling at the three borehole will be conducted to obtain total uranium soil concentration data throughout the length of the boreholes from the vadose zone, PRZ and the top portion of the aquifer. The total uranium soil concentration results will be used to refine the existing three-dimensional model of uranium soil concentrations in the region where the investigation site is located. Together, the refined three-dimensional CSM and the uranium leachability characteristic tests (identified in Section 2.3.2) will be used to refine the EAA location. The uranium leachability characteristic tests will also be used to refine the treatment design and to document the pre-treatment leachability characteristics of the vadose zone and PRZ. Samples will also be used to conduct predominant uranium-bearing mineral phase analyses and flow-through column tests.

Results from samples collected at the initial three borehole locations was used to further refine the location of the EAA. Two additional boreholes have been selected for pretreatment sampling within the new boundary, and will be used to provide information for PSQ 2a, regarding the leachability characteristics of the PRZ and vadose zone. Tests performed on soils from the two new boreholes will be used to document the pre-treatment leachability characteristics of the vadose zone and PRZ within the EAA.

General requirements for training and certifications, documentation, field documentation, equipment/instrumentation maintenance and calibration, sample handling, custody, labeling and transportation are similar to those described in the 300 Area RI/FS SAP (DOE/RL-2009-45).

2.1 Sampling Objectives

Sampling activities for this post-ROD field investigation are intended to provide soil samples that are representative of conditions in the vadose zone and PRZ at the investigation site. Laboratory analysis of these samples for total uranium soil concentration and for uranium leachability characteristics will provide data to refine the location of the EAA and the phosphate infiltration/injection strategy for Stage A of the uranium sequestration remediation design. In addition, mineral phase testing and flow-through column tests on samples collected from at least one borehole will be performed for the purposes of refining the CSM.

2.2 Borehole Drilling

The boreholes are proposed to be drilled with resonant sonic technology at the post-ROD field investigation site (Figure 3) to collect soil samples. Resonant sonic drilling is preferred over conventional drilling methods because this technique is faster and has the capacity to sample the larger gravel/cobbles found in the 300 Area, while providing the sample volumes needed. Alternative drilling methods may be used with approval of the OU technical lead in consultation with the well maintenance and drilling manager. To avoid potential impact to the representativeness of vadose zone and PRZ soil samples, all efforts must be made to drill without the use of slurry makeup water. In the event that drilling slurry makeup water is needed, the situation must be discussed with project technical staff before proceeding.

Boreholes will be drilled to approximately 105.6 m (346.5 ft) (NAVD88), which is expected to be at approximately10.8 m (35.3 ft) bgs (depth does not include additional drilling pad thickness, if any). The final total depth of the boreholes will be confirmed by the drilling buyer's technical representative and site geologist and may change depending on the actual ground surface elevation or subsurface conditions encountered. In the event that subsurface conditions prevent completion of the borehole to its intended depth, the OU project manager will be consulted to determine the path forward (e.g., re-drill the borehole at another location or accept the modified final depth for that borehole).

Proposed borehole locations are shown on Figure 3, with the estimated NAD83, *North American Datum of 1983*, coordinates provided in Table 4.

Table 4. Estimated Location Coordinates for Proposed Boreholes (NAD83 State Plane)

Location	Borehole Identification	Northing (m)	Easting (m)
1	C8933	116437	594120
2	C8936	116482	594165
3	C8938	116527	594165
4	C8940	116459	594117
5	C9451	116455	594090

Source: NAD83, *North America Datum of 1983*.

2.3 Sampling Methods

To ensure sample and data usability, the sampling associated with this SI will be performed in accordance with DOE/RL-96-68, *Hanford Analytical Services Quality Assurance Requirements Documents* (HASQARD), pertaining to sample collection, collection equipment, and sample handling. Soil samples will be collected throughout the length of the borehole, initiating at approximately 3 m (10 ft) bgs into the top of the aquifer at approximately 105.6 m (346.5 ft) (NAVD88) which is anticipated to be approximately one split-spoon sampler length into the aquifer (Figure 4). Sampling will be performed using a 10.2 cm (4 in.) diameter, 0.76 m (2.5 ft) long split-spoon sampler. The split-spoon samplers will be equipped with four separate polycarbonite liners that are each 15.2 cm (6 in.) long. If sufficient sample recovery is not achieved, soil from the split-spoon drive shoe may be used to supplement the sample mass of the split-spoon liners. Site personnel will not overdrive the sampling device.

Table 5. Borehole Locations and Depths

Sample Location		C8933, C8936, C8938, C8940, C9451		
Estimated Depth to Water		7 to 10 m (23 to 32.8 ft) bgs		
Projected Total Depth		Approximately 10.8 m (35.3 ft) bgs		
Media	**Sample Type** [a]	**Estimated Depth**	**Analytes**	**Sample Locations**
Soil	Grab sample from split-spoon liners in position B[b]	Sample collected at approximately 0.8 m (2.5 ft) intervals from split-spoon liners in position B. Split-spoon sampler to collect samples beginning at 3 m (10 ft) bgs to approximately 0.76 m (2.5 ft) into the aquifer.	Total uranium (<2 mm grain-size fractions)	C8933, C8936, C8938, C8940, C9451
	Grab sample from split-spoon liners in position B and/or intact split-spoon liners from positions A, C, and D.	Sample location and soil horizon to be selected based on combination of total uranium soil concentration data with the three-dimensional model of uranium soil concentrations. One sample from within the vadose zone and one from within the PRZ.	Uranium using semi-selective chemical extraction (<2 mm grain-size fractions)	C8933, C8936, C8938, C8940, C9451
			Labile uranium using sodium bicarbonate/ carbonate extraction (<2 mm grain size fractions)	C8933, C8936, C8938, C8940, C9451
			pH analysis	C8933, C8936, C8938 C8940, C9451
			Grain size (laboratory analysis)	C8933, C8936, C8938 C8940, C9451
			Predominant uranium-bearing mineral phase (<2 mm grain-size fractions)	C8933, C8936, C8938
	Intact split-spoon liners from positions A, C, and D	Split-spoon sampler to collect samples beginning at 3 m (10 ft) bgs to lower limit of the PRZ. Sample location and soil horizon to be determined by project team.	Field texture sediment flow-through column test	C8933, C8936, C8938
			<2 mm grain-size fractions flow-through column test	C8933, C8936, C8938
	All split-spoon liners	Continuous	Lithology description Core photographs	C8933, C8936, C8938, C8940, C9451

Note: Depths are approximate; field conditions need to be considered for actual collection depth.

a. Does not include samples for quality assurance/quality control.

b. Grab sample from split-spoon liners in position A, B, or C may be used for samples collected from within the saturated zone (aquifer).

bgs = below ground surface PRZ = periodically rewetted zone

All split-spoon liners from the vadose zone and PRZ will be held/stored until a decision is made by the project team regarding which samples intervals (location and soil horizons) will be used. Unused split-spoon liners will be maintained until final intervals are selected for all of the analyses/tests for this SI (i.e., uranium soil concentration, leachability tests, pH analysis, grain-size measurements, mineral phase analysis, and flow-through column tests). Unused split-spoon liners will be archived until tests are complete. A summary of the mineral analysis and flow-through column tests samples are provided in Table 5.

2.3.4 Additional Data Collection Activities

The site geologist will provide a lithologic description of each split-spoon liner, noting the soil size fractions and capturing a sample photo log. The ends of each split-spoon liner will be photographed in the field prior to capping or transfer to the stainless-steel bowl. Decommissioning of boreholes will occur once approved by the OU project manager and will be conducted in accordance with WAC 173-160, "Minimum Standards for Construction and Maintenance of Wells."

2.3.5 Field Screening

Radiological field screening data, visual observation of lithologies, or site geologist professional judgment may be used to adjust borehole locations, select sample locations in split-spoon liners, assist in determining sample shipping requirements, and support worker health and safety monitoring. Section 2.3.7 describes radiological field screening methods.

2.3.6 Decontamination of Sampling Equipment

Sampling equipment shall be decontaminated in accordance with the sampling equipment decontamination methods. To prevent potential contamination of samples, care should be taken to use decontaminated equipment for each sampling activity.

2.3.7 Radiological Field Data

Radiological screening will be performed by the radiological control technician or other qualified personnel in accordance with approved methods and with HASQARD (DOE/RL-96-68), as applicable. The radiological control technician will record field measurements, noting the depth of the sample and the instrument reading. Measurements will be relayed to the site geologist for inclusion in the field logbook or operational records daily, as applicable.

2.3.8 Sampling of Two Additional Pretreatment Boreholes

Analysis of soil samples from the two additional boreholes (C8940 and C9451) necessary to satisfy PSQ2a and gather pretreatment data within the refined Stage A EAA will be conducted as listed in Table 5 above. To understand pre-treatment leachability characteristics of the vadose zone and PRZ samples from selected intervals within the vadose zone and PRZ will be analyzed for total uranium and uranium leachability characteristics as described in sections 2.3.1 and 2.3.2, respectively.

2.4 Sample Handling

Sample handling and transfer shall be in accordance with established methods to preclude loss of identity, damage, deterioration, and loss of sample. Custody seals or custody tape shall be used to verify that sample integrity has been maintained during sample transport. The custody seal will be inscribed with the sampler's initials and date.

A sampling and data tracking database is used to track the samples from the point of collection through the laboratory analysis process.